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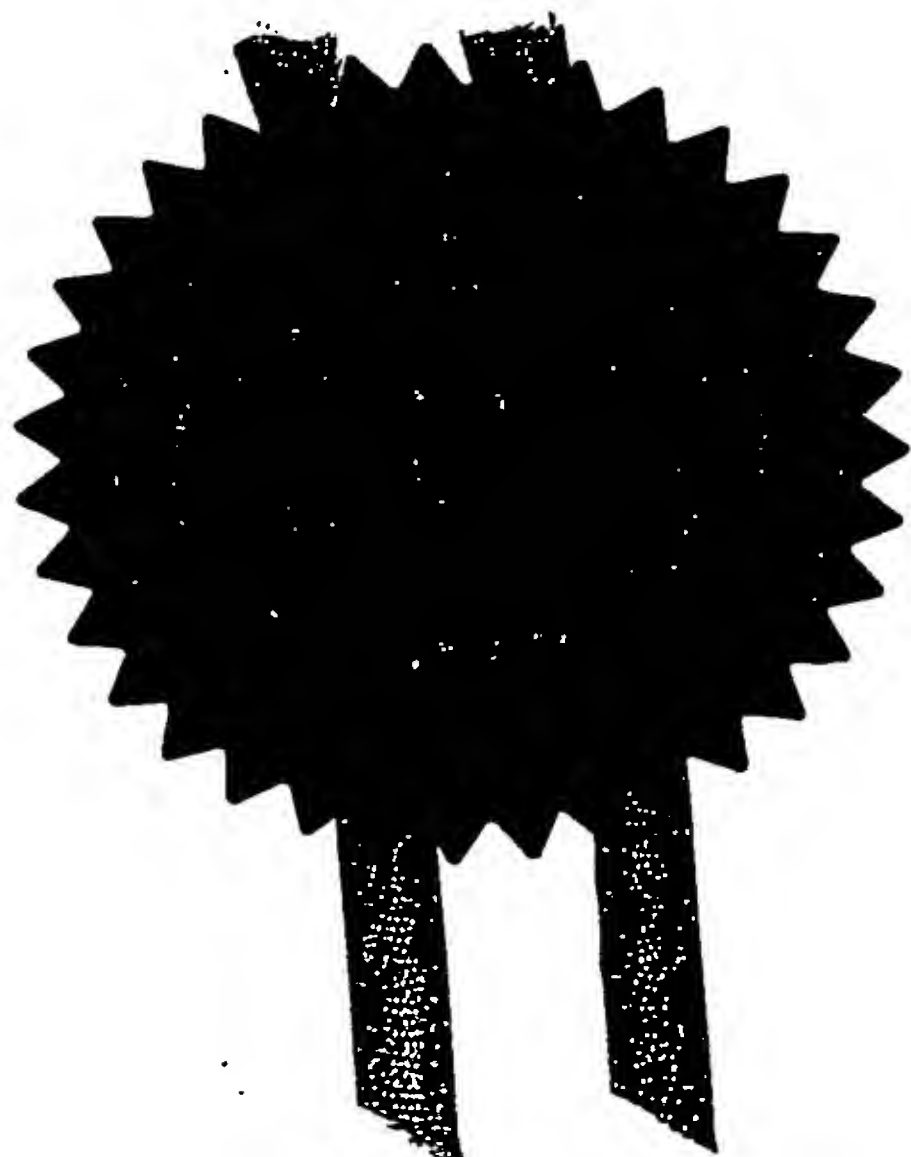
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1. Your reference	0629-A		
2. Patent application number (The Patent Office will fill in this part)	0208776.5		17 APR 2002
3. Full name, address and postcode of the or of each applicant (underline all surnames)	Roger Hanif <u>ARMOUR</u> Tabley House 88 Wymondley Road Hitchin Hertfordshire SG4 9PX  Patents ADP number (if you know it)  If the applicant is a corporate body, give the country/state of its incorporation UNITED KINGDOM		
4. Title of the invention	OPHTHALMOSCOPE		
5. Name of your agent (if you have one)	BRITTER AND CO		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	Enterprise House 14b Whitehorse Street Baldock Hertfordshire SG7 6QN		
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application		Date of filing (day / month / year)
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:	NO		
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Claim (s)

3 /

Abstract

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Drawing (s)

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11. I/We request the grant of a patent on the basis of this application.

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*Keith P Britter*

Date 17.04.02

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DUPLICATE

- 1 -

OphthalmoscopeField of the Invention

5        This invention relates to ophthalmoscopes and especially, but not exclusively, to ophthalmoscopes which are simple and inexpensive to manufacture.

Background to the Invention

10

      An ophthalmoscope is a complex optical instrument used for examining the retina of humans and animals. Generally ophthalmoscopes have more than twenty lenses and from three to six lights and, as such, are  
15 intricate and costly to manufacture and buy.

      Ophthalmoscopes are routinely used during the day-to-day work of doctors, optometrists, veterinary surgeons, health workers and trainees of the above.

20

      However, due to the expensive nature of this instrument, only limited numbers are available for actual use and certainly there is no way that an ophthalmoscope can be provided for each, for example,  
25 doctor who needs to use one.

      Due to the shortage of these instruments and their complexity, students and even non-specialised medical staff very often do not get a chance to learn how to  
30 use this instrument properly.

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This situation is worse in less developed and third world countries where in some places there are no ophthalmoscopes available to local doctors or aid workers because they are simply too expensive to buy or  
5 manufacture.

The problem of the restricted numbers of ophthalmoscopes in hospitals, opticians and veterinary surgeries, along with the associated lack of expertise  
10 in using the instrument, when available, is therefore potentially serious and any attempt to reduce the complexity of the instrument and the manufacturing costs is sought.

15 "Manufacture and Use of Homemade Ophthalmoscopes: a 150<sup>th</sup> Anniversary Tribute to Helmholtz" a publication from BMJ, 23-30 December 2000, Vol 321, p1557-1559, discloses a simple ophthalmoscope. This instrument, although much simpler and cheaper to produce than  
20 standard ophthalmoscopes, has a major problem in that the sight hole through which the retina is observed, causes glare in the observer's eye, thereby severely reducing the view.

25 Any method of producing cheaply a simple ophthalmoscope which eliminates, or at least substantially reduces, the problems commonly associated with the simple ophthalmoscope disclosed in the above mentioned paper, is therefore sought.

30

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The Present Invention

Accordingly it is an object of the present invention to overcome, or at least substantially reduce  
5 the disadvantages associated with known types of ophthalmoscope, such as those discussed above.

One aspect of the invention provides an ophthalmoscope comprising:

10

means defining a first light path;

reflective means arranged to divert light from the first light path along a second light path exiting the  
15 ophthalmoscope through a first window and into a subject eye;

a second window through which an user can view a subject eye along a path extending generally parallel  
20 to the second light path; and

a baffle which is arranged between the first light path and the second window to prevent, or at least substantially reduce, any light exiting the  
25 ophthalmoscope through the second window.

The apparatus may also comprise a light source, which can be incorporated with the other components of the apparatus as another component thereof, or may be  
30 arranged to receive a separate, detachable light source.



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The first light path defining means may comprise a tube wherein, preferably, at least the outer surface of the tube is opaque and the inner surface may be non-reflective.

5

The reflective means may comprise a mirror, preferably semicircular, which is inclined at approximately 45° to the first light path and/or the second light path. Alternatively, the reflective means  
10 may comprise a prism.

---

Both the first and second windows can be an aperture in, for example, a tube defining the first light path. Any such aperture is preferably circular.

15

The reflective means may be associated with the baffle which is preferably either a flange or a block. With a block, the reflective means is preferably mounted thereon.

20

The positioning and dimensions of the baffle ensure that little or no light reaches the second window and, as a consequence, no, or very little, glare through the second window is experienced by an user.

25

#### Brief description of the drawings

Figure 1 shows a partial exploded view of a prior art ophthalmoscope;

30

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Figure 2 shows the prior art ophthalmoscope of Figure 1 assembled, with a detachable light source provided;

5 Figure 3 shows the prior art ophthalmoscope of Figures 1 and 2 in use;

Figure 4 shows a partial section of a first embodiment of ophthalmoscope in accordance with the  
10 invention and in use; and

Figure 5 shows a second embodiment, again in partial section, of ophthalmoscope in accordance with the invention and in use.

15

Detailed description of drawings

Referring firstly to Figure 1 of the drawings, a prior art ophthalmoscope, indicated generally at 1,  
20 comprises a tube 2 defining a first light path a, reflective means in the form of an oval mirror 3, a first window 4 in the form of a circular aperture in the side wall of the tube 2, a second window 5 in the form of a circular aperture in an oval roof 7 of the  
25 tube 2, and a glare disc 6.

The ophthalmoscope 1 is arranged such that the mirror 3 forms the underside of the inclined roof 7 of the tube 2, with the second window 5, passing generally  
30 centrally through the mirror 3.



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This mirror 3 diverts light passing from a light source 8 along the first light path a, as shown in Figure 3, along a second light path b exiting the tube 2 through the first window 4 and into a subject eye 9.

5

The second window 5 allows an user 10 to view the subject eye 9 along a path extending generally parallel to and coincident with the second light path b.

10 However, as can be seen from Figures 2 and 3, this design has a problem, in that the first window 4 causes glare, as indicated diagrammatically at C, in the user's eye 10, thereby severely reducing the view of the subject eye 9, because some of the light from light  
15 path a exits through the second window 5, causing this undesirable glare.

In order to reduce this glare, the glare disc 6 is secured to the upper surface of the inclined roof 7 of the tube 2, with a centrally-located, circular aperture  
20 11 lying in-register with the circular aperture of the second window 5. In effect, the thickness of the glare disc 6 in the region of the central aperture 11 increases the total thickness of the two apertures 5  
25 and 9, in an attempt to reduce glare.

However, and as discussed briefly above, such a remedy was unsuccessful, with a user still experiencing an unreasonable amount of glare passing through the  
30 respective in-register apertures 5, 11 of the tube roof 7 and glare disc 6.

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As can be seen from Figure 2, the light source 8 is provided by a light pen 12 inserted in the bottom end of the tube 2 which is opaque and which preferably has a matt black, non-reflective inner surface.

In order to eliminate, or at least substantially reduce, this glare associated with the known ophthalmoscope 1 discussed above in relation to Figures 1 to 3, an ophthalmoscope in accordance with the invention is provided with a baffle arranged between the first light path and second window, as will be described in more detail hereinbelow with respect to the two embodiments of inventive ophthalmoscope shown in Figures 4 and 5.

Referring therefore to Figure 4, a first embodiment of ophthalmoscope, indicated generally at 21, comprises an opaque tube 22 of which only the top end is shown and which defines a first light path  $a$ , reflective means in the form of a planar semi-circular mirror 23, a first window 24 formed as a circular aperture in the side wall of the tube 22, a second window 25 in the form of a circular aperture in the roof 27 of the tube 22 and a baffle 26 located between the first light path  $a$  and the second window 25.

Light passing along a first light path  $a$  from a light source (not shown), such as the light source 8 of a light pen 12 shown in Figure 2, is reflected through  $90^\circ$  at the  $45^\circ$  angled mirror 23 along a second light

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path *b* which then passes through the first window 24 and then into a subject eye 29.

The mirror 23 is mounted to a downwardly extending  
5 extension 31 of the baffle 26, at 45° thereto.

The eye 30 of a user is able to view the retina of the subject eye 29 along a path *d* extending through the second and first windows 25, 24, such path *d* being  
10 ~~generally parallel to the second light path *b*.~~

Because the baffle 26, and to a certain extent its extension 31, is located between the first light path *a* and the second viewing window 25, any light which might  
15 otherwise pass through that window 25 into the eye 30 of a user, is eliminated or at least substantially reduced, thereby substantially reducing glare and enhancing the user's view of the subject eye 29.

20 Spurious light which is not diverted along the light path *b*, which is negligible or comparatively minimal, is substantially absorbed by the matt black interior surface of the tube 22.

25 Turning now to the second embodiment of ophthalmoscope 41 shown in Figure 5, again only the top end of a tube 42 defining a first light path *a* is shown, along with a planar mirror 43, a first window 44 in the form of a circular aperture in the side wall of  
30 the tube 42, a second window 45 in the form of a

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circular aperture in the roof 47 of the tube 42 and a block 46 upon which the mirror 43 is mounted and which, in turn, is mounted to the tube roof 47.

5 Light from a light source passing along the first light path *a* defined by the tube 42, is reflected by the mirror 43 through 90° along the light path *b* and then into a subject eye 49.

10 That eye 49 can be viewed by the eye 50 of a user along a path *d* extending through the second and first windows 45, 44.

The combination of the block 46 and mirror 43, as  
15 well as the dimensions thereof, and particularly the thickness, of the block 46, acts as a baffle between the first light path *a* and second viewing window 45, thereby eliminating, or at least substantially reducing, any glare, which might otherwise enter the  
20 user's eye via the second viewing window 45 and which is thus prevented from doing so.

As in the case of the first embodiment described above in relation to Figure 4, this second embodiment  
25 also enhances the viewing capability of a user's eye 50 into the subject eye 49 along the path *d* which is substantially parallel to the second light path *b*.

Thus, it can be seen that an ophthalmoscope 21, 41  
30 in accordance with the invention eliminates, or at least substantially reduces, any glare in the eye of

- 10 -

the user, thereby dramatically improving the user's  
view of a subject eye.

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CLAIMS

1. An ophthalmoscope comprising:

5 means defining a first light path;

reflective means arranged to divert light from the first light path along a second light path extending through a first window and into a subject eye;

10

a second window through which an user can view a subject eye along a path extending generally parallel to the second light path; and

15

a baffle is arranged between the first light path and second window to prevent, or at least substantially reduce, any light exiting through the second window.

2. An ophthalmoscope as claimed in claim 1, wherein  
20 the first light path defining means comprises a tube

3. An ophthalmoscope as claimed in claim 2, wherein at least the outer surface of the tube is opaque.

25 4. An ophthalmoscope as claimed in claim 2 or 3. Wherein the inner surface of the tube is non reflective.

5. An ophthalmoscope as claimed in any preceding  
30 claim, wherein said reflective means comprises a mirror.



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6. An ophthalmoscope as claimed in claim 5, wherein the mirror is semi-circular.

7. An ophthalmoscope as claimed in any preceding claim, wherein said reflective means is inclined at approximately  $45^\circ$  to the first light path and/or the second light path.

8. An ophthalmoscope as claimed in any of claims 1 to 4, wherein the reflective means comprises a prism.

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9. An ophthalmoscope according to any preceding claim, wherein the first window is an aperture.

10. An ophthalmoscope according to any preceding claim, wherein the second window is an aperture.

11. An ophthalmoscope according to any preceding claim, wherein said reflective means is mounted on the baffle.

12. An ophthalmoscope according to any preceding claim, wherein the baffle is a flange.

13. An ophthalmoscope according to any of claims 1 to 11, wherein the baffle is a block.

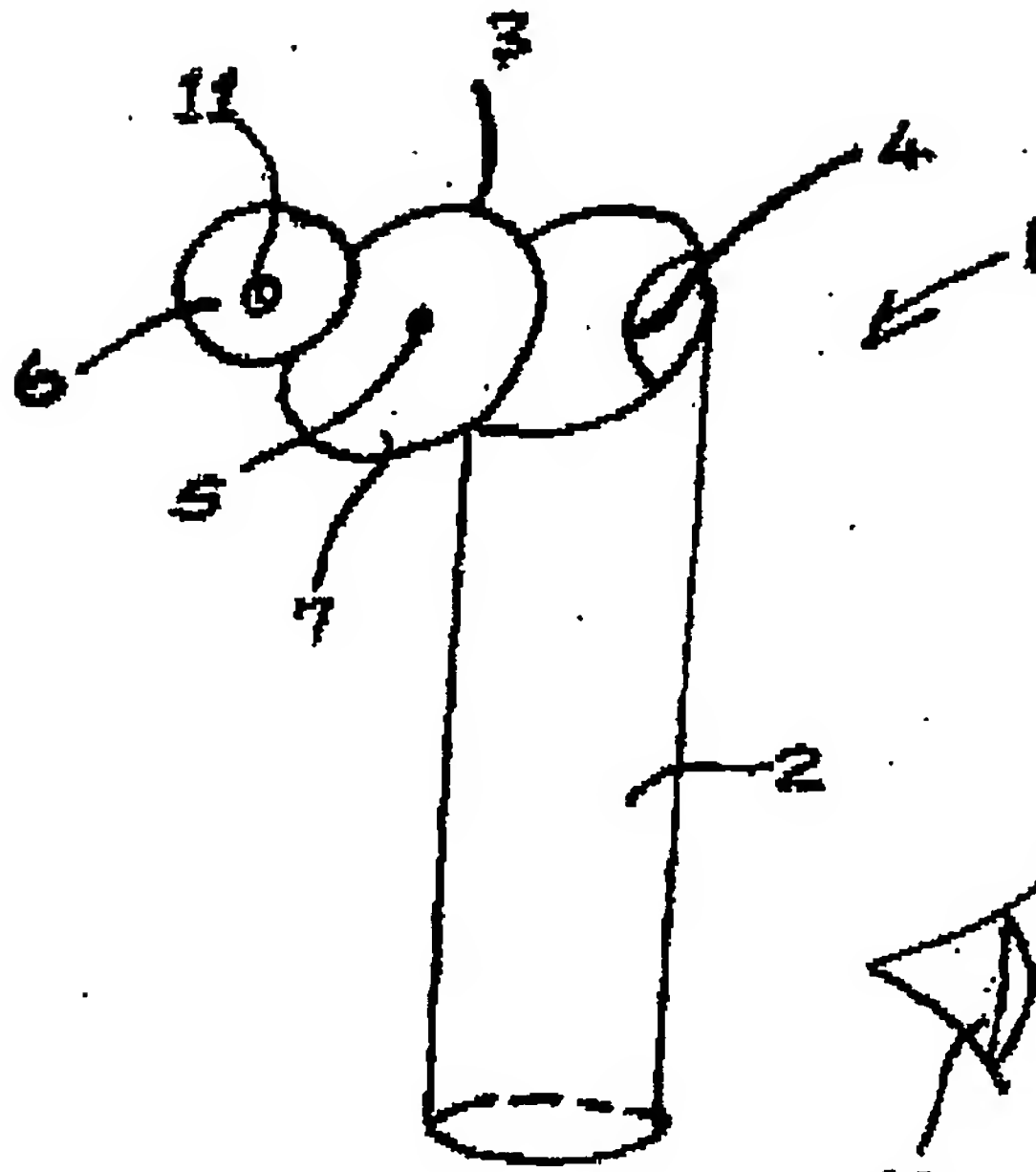
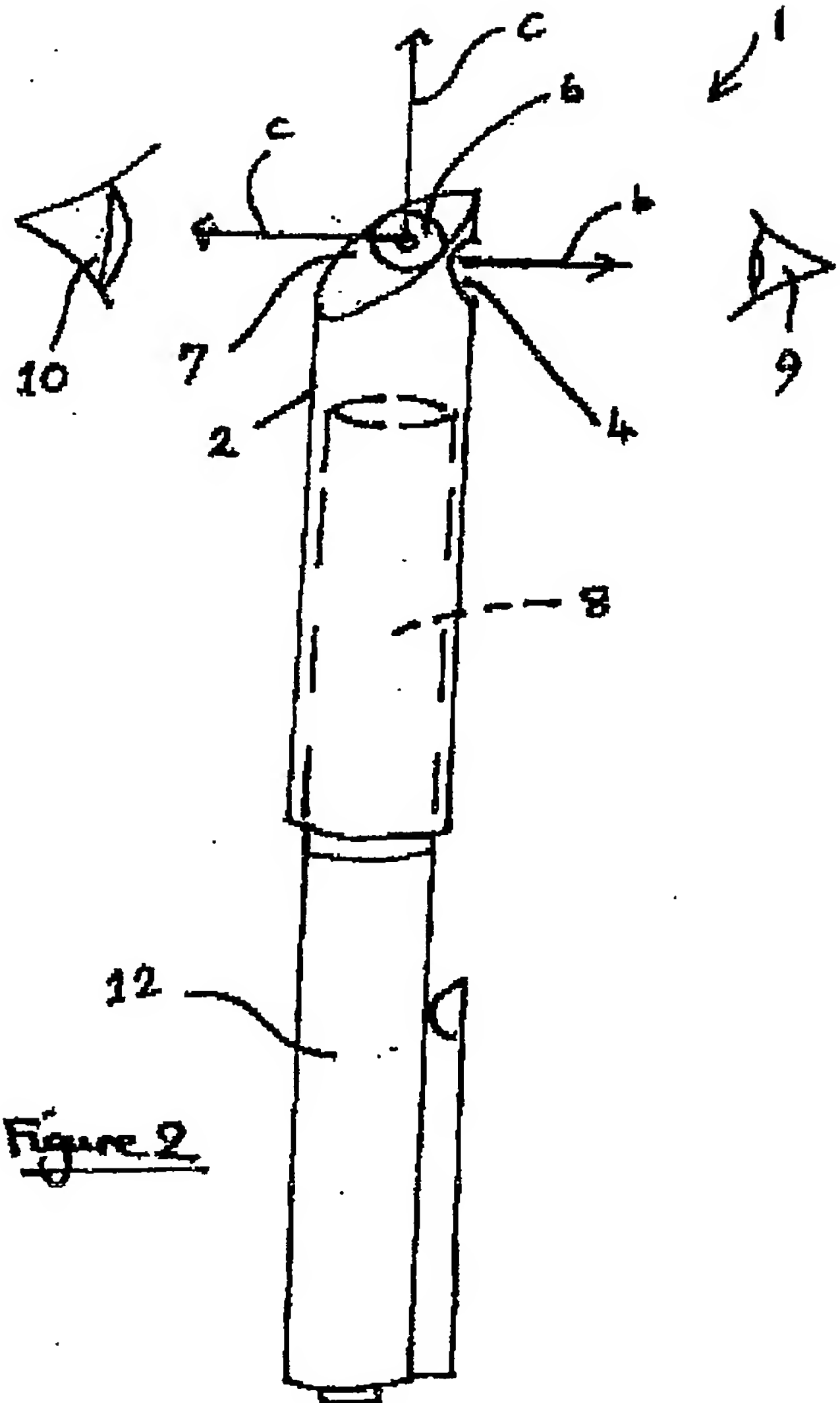
14. An ophthalmoscope according to any preceding claim, wherein the baffle ensures that substantially all light passing along the first light path is diverted along the second light path.

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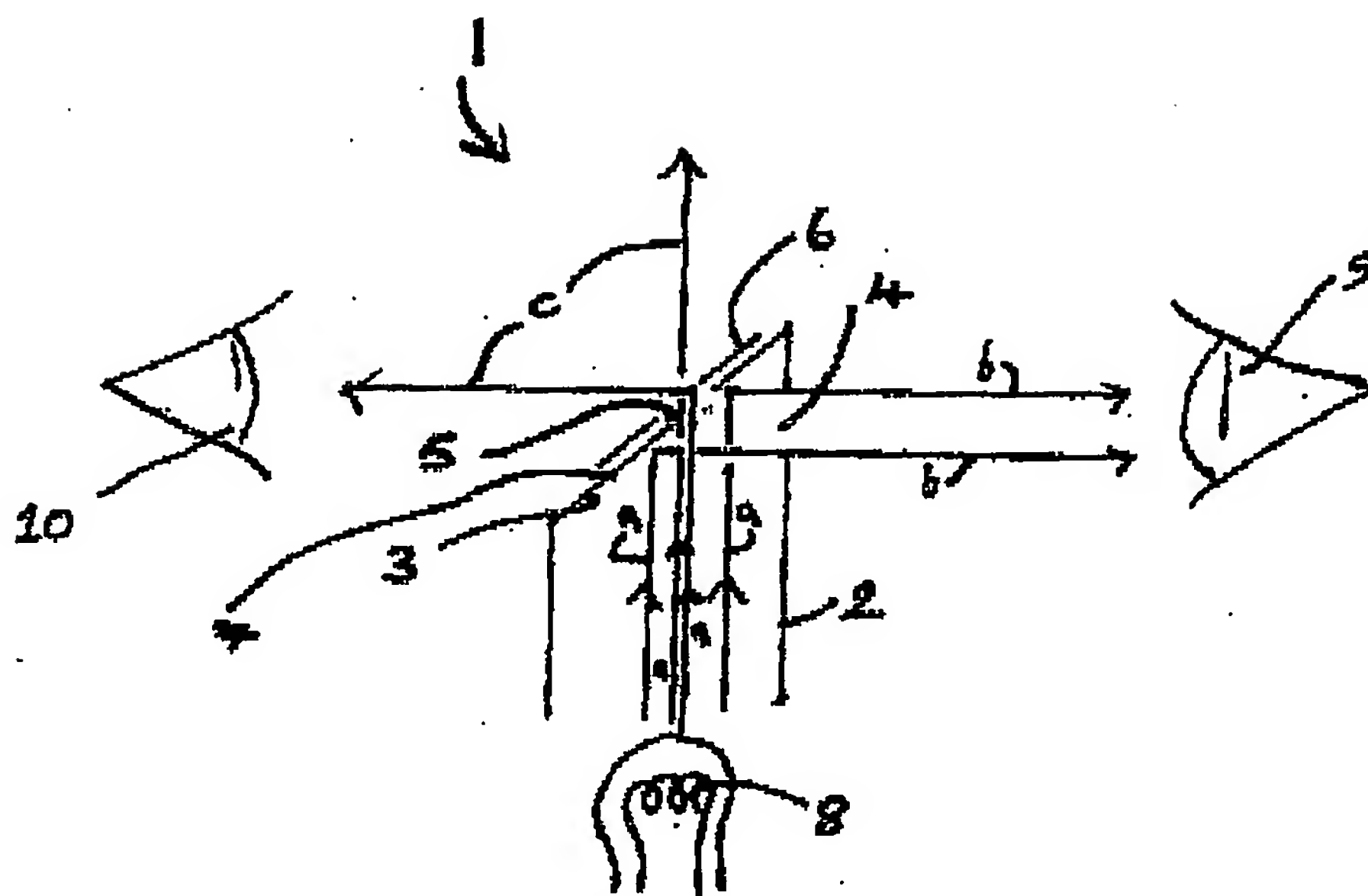
15. An ophthalmoscope substantially as hereinbefore described and with reference to the accompanying drawings.

5

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Figure 1Figure 2

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Figure 3

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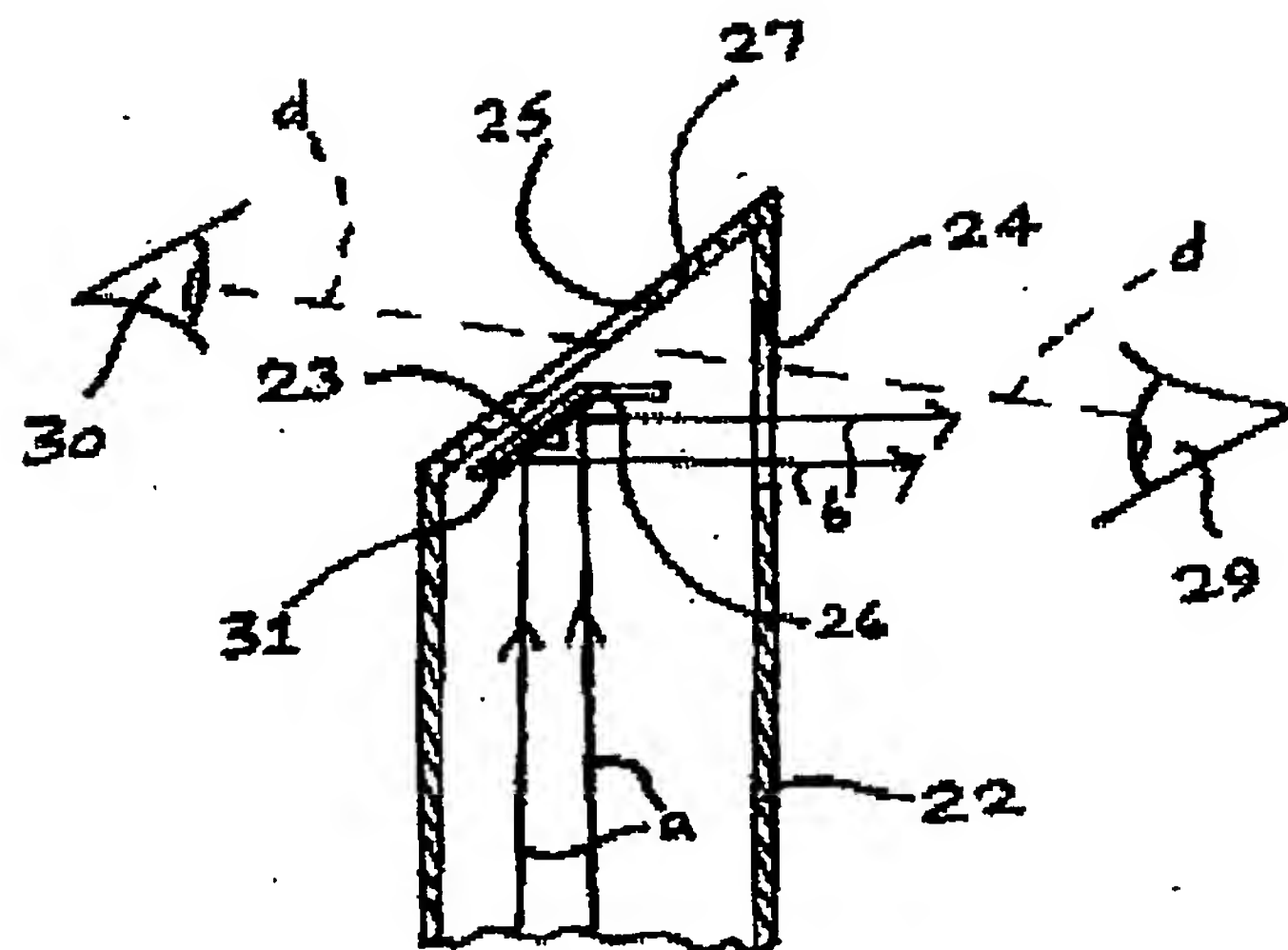
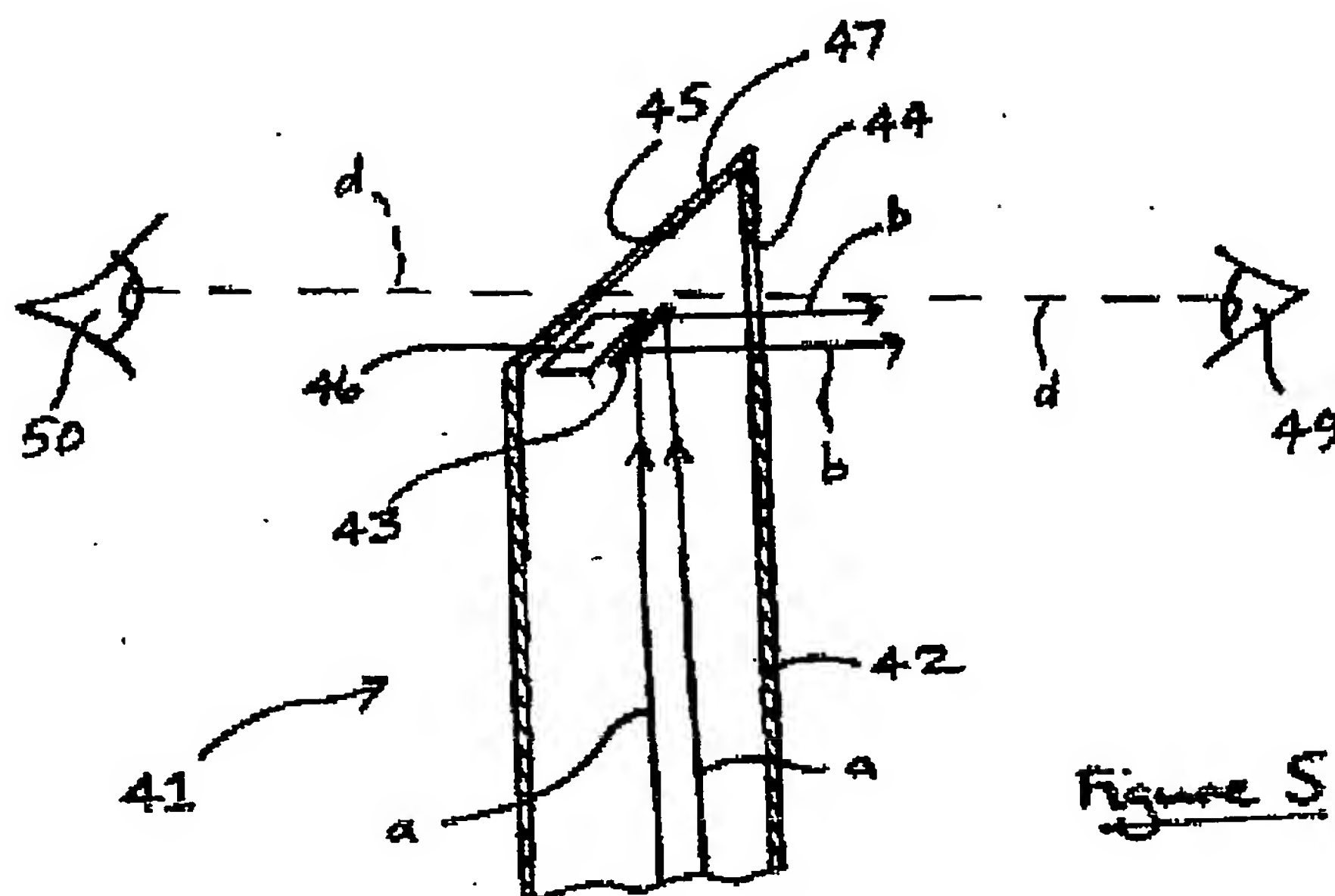


Figure 4

21



### Figure 5

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